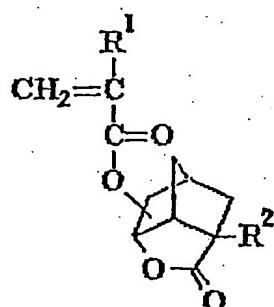


WHAT IS CLAIMED IS:

1. A (meth)acrylate derivative represented by the formula (1):

5



(1)

10

wherein R¹ and R² are each a hydrogen atom or a methyl group.

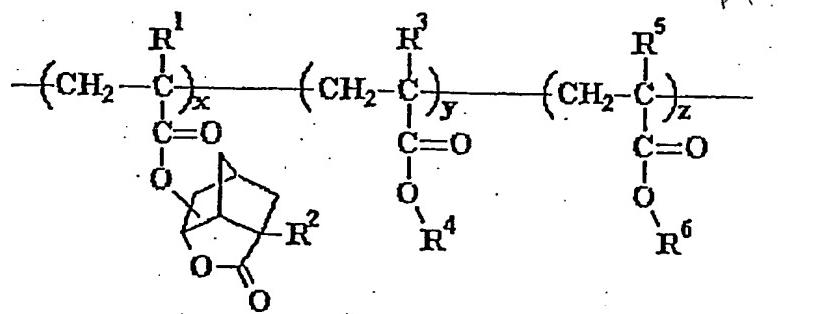
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2. A polymer which is obtained by polymerizing the (meth)acrylate derivative described in Claim 1, or copolymerizing the (meth)acrylate derivative described in Claim 1 with another polymerizable compound.

20

3. The polymer according to Claim 2 which is represented by the formula (2) and has a weight-average molecular weight of 2000 to 200000:

25



(2)

wherein R¹, R², R³ and R⁵ are each a hydrogen atom or a methyl group; R⁴ is an acid-labile group, an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has an acid-labile group, an alicyclic hydrocarbon group

- 5 having 7 to 13 carbon atoms, which has a carboxyl group, or a hydrocarbon group having 3 to 13 carbon atoms, which has an epoxy group; R⁶ is a hydrogen atom, a hydrocarbon group having 1 to 12 carbon atoms, or an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has
10 a carboxyl group; and x, y and z are optional values which meet x + y + z = 1, 0 < x ≤ 1, 0 ≤ y < 1 and 0 ≤ z < 1.

4. A photoresist material which includes at least the polymer described in Claim 2 and a photo-acid generator for generating an acid by exposure.

5. A photoresist material which includes at least the polymer described in Claim 3 and a photo-acid generator for generating an acid by exposure.

6. A photoresist material according to Claim 4 which further includes a polyhydric alcohol.

25 7. A photoresist material according to Claim 5 which further includes a polyhydric alcohol.

A.Y.

8. A photoresist composition which comprises 70 to 99.8% by weight of the polymer described in Claim 2 and 0.2 to 30% by weight of a photo-acid generator for generating an acid by exposure.

9. A photoresist composition which comprises 70 to 99.8% by weight of the polymer described in Claim 3 and 0.2 to 30% by weight of a photo-acid generator for generating an acid by exposure.

10. A method for forming a pattern which comprises a step of applying the photoresist material described in Claim 4 onto a substrate to be worked, a step of exposing the material to a light having a wavelength of 180 to 220 nm, a step of carrying out baking, and a step of performing development.

11. A method for forming a pattern which comprises a step of applying the photoresist material described in Claim 5 onto a substrate to be worked, a step of exposing the material to a light having a wavelength of 180 to 220 nm, a step of carrying out baking, and a step of performing development.

25

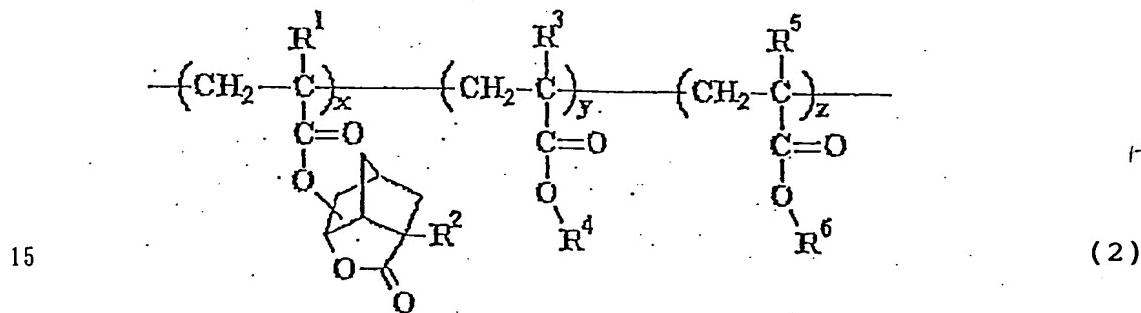
12. The method for forming the pattern according

*Q3
cll*

to Claim 10 wherein the exposure light is an ArF excimer laser light.

13. The method for forming the pattern according
5 to Claim 11 wherein the exposure light is an ArF excimer laser light.

14. A polymer which is represented by the formula
(2) and has a weight-average molecular weight of 2000 to
10 200000:



wherein R¹, R², R³ and R⁵ are each a hydrogen atom or a methyl group; R⁴ is an acid-labile group, an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has an acid-labile group, an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has a carboxyl group, or a hydrocarbon group having 3 to 13 carbon atoms, which has an epoxy group; R⁶ is a hydrogen atom, a hydrocarbon group having 1 to 12 carbon atoms, or an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has a carboxyl group; and x, y and z are optional values.

which meet $x + y + z = 1$, $0 < x \leq 1$, $0 \leq y < 1$ and $0 \leq z < 1$.

15. A (meth)acrylate derivative having an alicyclic
5 lactone structure which is represented by the formula
(4):

R⁸

(4)

where
hydro
alicyclic

methyl group; R⁹ is a
atoms having an

15

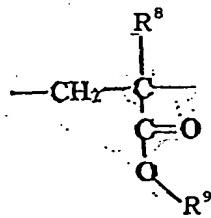
16.
(meth)acrylate
copolymer
Claim 15
20 weight-average

by polymerizing the
Claim 15, or
vative described in
upound and has a
to 200000.

20

17. In contrast, the solubility to an
alkaline aqueous solution of which increases due to the
decomposition of an acid-decomposable group thereof by an
25 action of an acid, said resin is the resin for resist

having a (meth)acrylate unit of an alicyclic lactone structure represented by the formula (3):



(3)

wherein R⁸ is a hydrogen atom or a methyl group, and R⁹ is a hydrocarbon group of 7 to 16 carbon atoms having an alicyclic lactone structure.

18. The resin for resist according to Claim 17 wherein said resin is the polymer of Claim 2 or Claim 14.

19. A photoresist material which includes at least the polymer described in Claim 14 or 16 and a photo-acid generator for generating an acid by exposure.

20. The photoresist material according to Claim 19 which further includes a polyhydric alcohol.

21. A photoresist composition which at least comprises 70 to 99.8% by weight of the polymer described in Claim 17 or 18 and 0.2 to 30% by weight of a photo-acid generator for generating an acid by exposure.

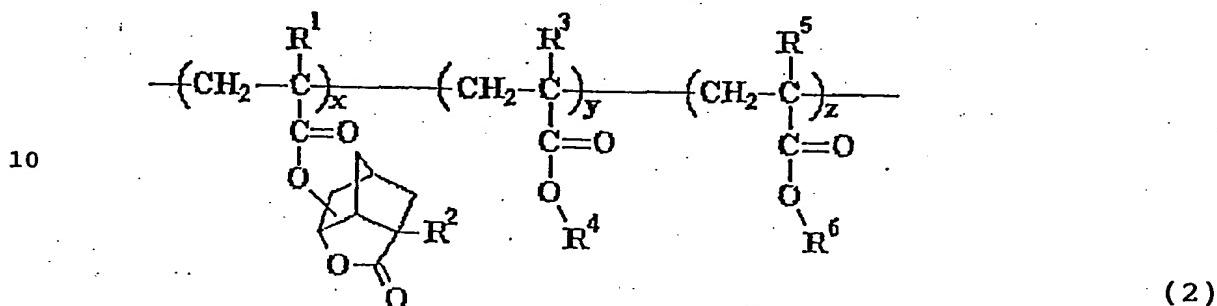
A.Y.C.

22. A method for forming a pattern which comprises at least a step of applying the photoresist composition described in Claim 21 onto a substrate to be worked, a 5 step of exposing the composition to a light having a wavelength of 180 to 220 nm, a step of carrying out baking, and a step of performing development.

23. The method for forming the pattern according to 10 Claim 22 wherein the exposure light is an ArF excimer laser light.

ABSTRACT OF THE DISCLOSURE

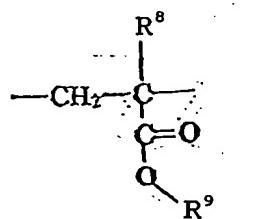
There are here disclosed a photoresist material for lithography using a light of 220 nm or less which comprises at least a polymer represented by the following formula (2) and a photo-acid generator for generating an acid by exposure:



wherein R¹, R², R³ and R⁵ are each a hydrogen atom or a methyl group; R⁴ is an acid-labile group, an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has an acid labile group, an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has a carboxyl group, or a hydrocarbon group having 3 to 13 carbon atoms, which has an epoxy group; R⁶ is a hydrogen atom, a hydrocarbon group having 1 to 12 carbon atoms, or an alicyclic hydrocarbon group having 7 to 13 carbon atoms, which has a carboxyl group; x, y and z are optional values which meet x + y + z = 1, 0 < x ≤ 1, 0 ≤ y < 1 and 0 ≤ z < 1; and a weight-average molecular weight of the polymer is

in the range of 2000 to 200000, and a resin having a (meth)acrylate unit of an alicyclic lactone structure represented by the formula (3):

5



(3)

wherein R^8 is a hydrogen atom or a methyl group, and R^9 10 is a hydrocarbon group of 7 to 16 carbon atoms having an alicyclic lactone structure.

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